Climate Factors Influencing Coccidioidomycosis Seasonality and Outbreaks

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Running Title

Climate and Coccidioidomycosis

Keywords

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Abbreviations

CDC: Centers for Disease Control and Prevention

NRC: National Research Council

PM_{10}: Particulate Matter <10 μm diameter

R^2: Squared correlation coefficient, or explained variance

Outline of Section Headers

Abstract

Introduction

Data and Methods

Results

Concluding Discussion

Abstract

Although broad links between climatic factors and coccidioidomycosis have been established, the identification of simple and robust relationships linking climatic controls to seasonal timing and outbreaks of the disease have been elusive and remain poorly understood. Using an adaptive data-oriented method for estimating date of exposure, this paper analyzes hypotheses linking climate and dust to fungal growth and dispersion and evaluates their respective roles for Pima County, Arizona. Results confirm a strong bimodal disease seasonality that was suspected but not previously seen in reported data. Dispersion-related conditions are important predictors of coccidioidomycosis incidence during fall, winter and the arid foresummer. However, precipitation during the normally arid foresummer 1.5-2 years prior to the season of exposure is the dominant predictor of the disease in all seasons, accounting for half of the overall variance. Cross-validated models combining antecedent and concurrent conditions explain 80 percent of the variance in coccidioidomycosis incidence.